

Reply to Office Action of 05/26/2005
Amendment Dated: August 16, 2005

Appl. No.: 09/824,844
Attorney Docket No.: CSCO-007/3484

Listing of Claims

1 1. (Currently Amended): A method of processing a command requesting
2 information on any intermediate layer-2 devices present in a route from a first system to
3 a second system, said any intermediate devices being contained in a network implemented
4 on a broadcast medium, said network containing a plurality of devices including said any
5 intermediate devices, said method comprising:

6 receiving said command in a receiving device;

7 ~~—determining a first layer-2 device which is connected directly to said first system;~~
8 ~~logically viewing said first layer-2 device as a present layer-2 device if said second system~~
9 ~~is also not directly connected to said first layer-2 device;~~

10 sending a request packet from said receiving device to said a present layer-2 device
11 requesting information on whether said second system is connected directly to said present
12 layer-2 device;

13 receiving by said receiving device a response packet from said present layer-2
14 device, wherein said response packet indicates whether said second system is connected
15 directly to said present layer-2 device, wherein said response packet further identifies a
16 subsequent layer-2 device in a route from said present layer-2 device to said second system
17 if said second system is not connected directly to said present layer-2 device, wherein said
18 subsequent layer-2 device is next to said present layer-2 device in said route to said second
19 system; and

20 repeating by said receiving device said sending and receiving by using said
21 subsequent layer-2 device in the place of said present layer-2 device until said response
22 packet indicates that said second system is directly connected to said present layer-2
23 device.

1 2. (Currently Amended): The method of claim 1, ~~wherein a receiving device~~
2 ~~receives said command, and wherein said receiving device is not directly connected to said~~
3 ~~first layer-2 device, wherein said determining further comprises:~~

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4 locating a directly connected device which is connected directly to said first system;
5 using said directly connected device as said present layer-2 device, wherein said
6 locating and said using are performed before said sending; and
7 performing said repeating in said receiving device to determine said route.

1 3. (Original): The method of claim 2, wherein said locating comprises:
2 substituting said receiving device as said first layer-2 device; and
3 performing said repeating to determine said directly connected device.

1 4. (Previously Amended): The method of claim 2, wherein said locating comprises
2 sending a multicast packet directed to said plurality of devices, said multicast packet
3 containing an identifier of said first system, wherein each of said plurality of devices is
4 designed to respond indicating if said first system is connected directly to the device.

1 5. (Currently Amended): The method of claim 1, further comprising:
2 determining a first layer-2 device which is connected directly to said first system,
3 logically viewing said first layer-2 device as a present layer-2 device if said second system
4 is also not directly connected to said first layer-2 device;
5 wherein said determining, ~~sending, receiving, and repeating~~ are also performed
6 in a by said receiving device.

1 6. (Original): The method of claim 5, further comprising providing a command line
2 interface to enable a network administrator to enter said command on said receiving
3 device.

1 7. (Previously Amended): The method of claim 1, wherein said second system is
2 deemed to be directly connected to said first layer-2 device if said second system is
3 connected to a port of said first layer-2 device.

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1 8. (Original): The method of claim 7, further comprising:
2 receiving in said receiving device a neighbor packet from a neighbor device on at
3 least one port; and
4 concluding in said receiving device that a system communicating on another port
5 is connected directly to said another port by the absence of reception of neighbor packets
6 on said another port.

1 9. (Original): The method of claim 8, wherein said network is implemented using
2 Ethernet/802.3 protocol.

1 10. (Original): The method of claim 1, wherein said request packet and said
2 response packet are generated consistent with UDP/IP protocol.

1 11. (Currently Amended): The method of claim 1, wherein said ~~determining~~,
2 sending, receiving, and repeating are performed in a computer system.

1 12. (Currently Amended): A method of supporting the tracing of a route containing
2 a sequence of layer-2 devices between a first system and a second system, said method
3 being performed in a layer-2 device forming a part of a network, said method comprising:
4 receiving in said layer-2 device a request packet from a central device, said request
5 packet containing an identifier for said second system, wherein said request packet
6 requests information on whether said second system is connected directly to said layer-2
7 device;
8 determining in said layer-2 device whether said layer-2 device is connected directly
9 to said second system;
10 generating in said layer-2 device a response packet, wherein said response packet
11 indicates whether said second system is connected directly to said layer-2 device; and

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12 sending from said layer-2 device to said central device said response packet
13 irrespective of whether said central device is in said route or whether said layer-2 device
14 is a last device in said route.

1 13. (Currently Amended): The method of claim 12, wherein said generating further
2 comprises:

3 identifying in said layer-2 device a next device, wherein said next device is next to
4 said layer-2 device in a route from said first system to said second system; and
5 including data identifying said next device in said response packet.

1 14. (Currently Amended): The method of claim 13, wherein said identifying
2 comprises:

3 examining a table in said layer-2 device to determine a port on which said second
4 system communicates; and
5 locating a device connecting on said port, wherein said located device comprises
6 said next device.

1 15. (Original): The method of claim 14, wherein said locating comprises:
2 receiving a neighbor packet from said next device on said port indicating a next
3 device identifier identifying said next device; and
4 including said next device identifier in said response packet.

1 16. (Currently Amended): The method of claim 15, wherein said first system is
2 deemed to be connected directly to said layer-2 device if said first system is present on a
3 port of said layer-2 device, wherein determining is based on the absence of reception of
4 said neighbor packet on said port.

1 17. (Currently Amended): An apparatus processing a command requesting

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2 information on any intermediate layer-2 devices present in a route from a first system to
3 a second system, said any intermediate devices being contained in a network implemented
4 on a broadcast medium, said network containing a plurality of devices including said any
5 intermediate devices, said apparatus comprising:

6 means for receiving said command in a receiving device;

7 ~~means for determining a first layer-2 device which is connected directly to said first~~
8 ~~system, logically viewing said first layer-2 device as a present layer-2 device if said second~~
9 ~~system is also not directly connected to said first layer-2 device;~~

10 means for sending a request packet from said receiving device to said a present
11 layer-2 device requesting information on whether said second system is connected directly
12 to said present layer-2 device;

13 means for receiving a response packet from said present layer-2 device, wherein
14 said response packet indicates whether said second system is connected directly to said
15 present layer-2 device, wherein said response packet further identifies a subsequent layer-2
16 device in a route from said present layer-2 device to said second system if said second
17 system is not connected directly to said present layer-2 device, wherein said subsequent
18 layer-2 device is next to said present layer-2 device in said route to said second system;
19 and

20 means for repeating said sending and receiving by using said subsequent layer-2
21 device in the place of said present layer-2 device until said response packet indicates that
22 said second system is directly connected to said present layer-2 device

23 wherein said means for receiving and said means for repeating are also contained
24 in said receiving device.

1 18. (Currently Amended): The apparatus of claim 17, ~~wherein a receiving device~~
2 ~~receives said command, and~~ wherein said receiving device is not directly connected to said
3 first layer-2 device, wherein said means for determining further comprises:

4 means for locating a directly connected device which is connected directly to said

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5 first system;

6 means for using said directly connected device as said present layer-2 device; and

7 means for performing said repeating to determine said route, said means for

8 performing being contained in said receiving device.

1 19. (Previously Amended): The apparatus of claim 18, wherein said means for
2 locating comprises:

3 means for substituting said receiving device as said first layer-2 device; and

4 means for performing said repeating to determine said directly connected device.

1 20. (Previously Amended): The apparatus of claim 18, wherein said means for
2 locating comprises sending a multicast packet directed to said plurality of devices, said
3 multicast packet containing an identifier of said first system, wherein each of said plurality
4 of devices is designed to respond indicating if said first system is connected directly to the
5 device.

1 21. (Currently Amended): A layer-2 device for supporting the tracing of a route
2 containing a sequence of layer-2 devices between a first system and a second system, said
3 layer-2 device being comprised in a network based on broadcast medium, said layer-2
4 device comprising:

5 means for receiving in said layer-2 device a request packet from a central device,
6 said request packet containing an identifier for said second system, wherein said request
7 packet requests information on whether said second system is connected directly to said
8 layer-2 device;

9 means for determining in said layer-2 device whether said layer-2 device is
10 connected directly to said second system;

11 means for generating in said layer-2 device a response packet, wherein said
12 response packet indicates whether said second system is connected directly to said layer-2

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13 device; and
14 means for sending from said layer-2 device to said central device said response
15 packet irrespective of whether said central device is in said route or whether said layer-2
16 device is a last device in said route.

1 22. (Previously Amended): The layer-2 device of claim 21, wherein said means for
2 generating further comprises:

3 means for identifying in said layer-2 device a next device, wherein said next device
4 is next to said layer-2 device in a route from said first system to said second system; and
5 means for including data identifying said next device in said response packet.

1 23. (Currently Amended): The layer-2 device of claim 22, wherein said means for
2 identifying comprises:

3 means for examining a table in said layer-2 device to determine a port on which
4 said second system communicates; and
5 means for locating a device connecting on said port, wherein said located device
6 comprises said next device.

1 24. (Currently Amended): The layer-2 device of claim 23, wherein said means for
2 locating comprises:

3 means for receiving a neighbor packet from said next device on said port indicating
4 a next device identifier identifying said next device; and
5 means for including said next device identifier in said response packet.

1 25. (Currently Amended): The layer-2 device of claim 23, wherein said first system
2 is deemed to be connected directly to said layer-2 device if said first system is present on
3 a port of said layer-2 device, wherein determining is based on the absence of reception of
4 said neighbor packet on said port.

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1 26. (Currently Amended): A computer readable medium carrying one or more
2 sequences of instructions for causing a device to process a command requesting
3 information on any intermediate layer-2 devices present in a route from a first system to
4 a second system, said any intermediate devices being contained in a network implemented
5 on a broadcast medium, said network containing a plurality of devices including said any
6 intermediate devices, wherein execution of said one or more sequences of instructions by
7 one or more processors contained in said device causes said one or more processors to
8 perform the actions of:

9 receiving said command in a receiving device;

10 ~~—determining a first layer-2 device which is connected directly to said first system;~~
11 ~~logically viewing said first layer-2 device as a present layer-2 device if said second system~~
12 ~~is also not directly connected to said first layer-2 device;~~

13 sending a request packet from said receiving device to said a present layer-2 device
14 requesting information on whether said second system is connected directly to said present
15 layer-2 device;

16 receiving by said receiving device a response packet from said present layer-2
17 device, wherein said response packet indicates whether said second system is connected
18 directly to said present layer-2 device, wherein said response packet further identifies a
19 subsequent layer-2 device in a route from said present layer-2 device to said second system
20 if said second system is not connected directly to said present layer-2 device, wherein said
21 subsequent layer-2 device is next to said present layer-2 device in said route to said second
22 system; and

23 repeating by said receiving device said sending and receiving by using said
24 subsequent layer-2 device in the place of said present layer-2 device until said response
25 packet indicates that said second system is directly connected to said present layer-2
26 device.

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1 27. (Currently Amended): The computer readable medium of claim 26, ~~wherein~~
2 ~~said command is received in a receiving device~~, wherein said receiving device is not
3 directly connected to said first layer-2 device, ~~wherein said determining further comprises:~~
4 locating a directly connected device which is connected directly to said first system;
5 using said directly connected device as said present layer-2 device, wherein said
6 locating and said using are performed before said sending; and
7 performing said repeating in said receiving device to determine said route.

1 28. (Original): The computer readable medium of claim 27, wherein said locating
2 comprises:
3 substituting said receiving device as said first layer-2 device;
4 third performing said repeating;
5 using a last one of said present-layer 2 determined by said third performing as said
6 directly connected device.

1 29. (Previously Amended): The computer readable medium of claim 27, wherein
2 said locating comprises sending a multicast packet directed to said plurality of devices,
3 said multicast packet containing an identifier of said first system, wherein each of said
4 plurality of devices is designed to respond indicating if said first system is connected
5 directly to the device.

1 30. (Currently Amended): The computer readable medium of claim 26, further
2 comprising:
3 determining a first layer-2 device which is connected directly to said first system,
4 logically viewing said first layer-2 device as a present layer-2 device if said second system
5 is also not directly connected to said first layer-2 device;
6 wherein said determining, sending, receiving, and repeating are performed in a by
7 said receiving device.

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1 31. (Original): The computer readable medium of claim 30, further comprising
2 providing a command line interface to enable a network administrator to enter said
3 command on said receiving device.

1 32. (Previously Amended): The computer readable medium of claim 26, wherein
2 said second system is deemed to be directly connected to said first layer-2 device if said
3 second system is connected to a port of said first layer-2 device.

1 33. (Original): The computer readable medium of claim 32, further comprising:
2 receiving in said receiving device a neighbor packet from a neighbor device on at
3 least one port; and
4 concluding in said receiving device that a system communicating on another port
5 is connected directly to said another port by the absence of reception of neighbor packets
6 on said another port.

1 34. (Original): The computer readable medium of claim 33, wherein said network
2 is implemented using Ethernet/802.3 protocol and said request packet and said response
3 packet are generated consistent with UDP/IP protocol.

1 35. (Currently Amended): A computer readable medium carrying one or more
2 sequences of instructions for causing a layer-2 device to support the tracing of a route
3 containing a sequence of layer-2 devices between a first system and a second system, said
4 layer-2 device being comprised in a network based on broadcast medium, wherein
5 execution of said one or more sequences of instructions by one or more processors
6 contained in said layer-2 device causes said one or more processors to perform the actions
7 of:

8 receiving in said layer-2 device a request packet from a central device, said request

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9 packet containing an identifier for said second system, wherein said request packet
10 requests information on whether said second system is connected directly to said layer-2
11 device;
12 determining in said layer-2 device whether said layer-2 device is connected directly
13 to said second system;
14 generating in said layer-2 device a response packet, wherein said response packet
15 indicates whether said second system is connected directly to said layer-2 device; and
16 sending from said layer-2 device to said central device said response packet
17 irrespective of whether said central device is in said route or whether said layer-2 device
18 is a last device in said route.

1 36. (Currently Amended): The computer readable medium of claim 35, wherein

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